REVISED PROPOSAL TO THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
FOR CONTINUATION OF
NASA COOPERATIVE AGREEMENT NCC2-648

Submitted by:
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RESEARCH ON IMPLEMENTATION OF THE NASA JOINT SPONSORED RESEARCH PROGRAM AND OTHER INNOVATIVE MECHANISMS FOR COMMERCIALIZING PUBLICLY-FUNDED TECHNOLOGIES

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$1,255,740

Technical Monitor:
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NASA Ames Research Center

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TITLE AND ABSTRACT

RESEARCH ON IMPLEMENTATION OF THE NASA JOINT SPONSORED RESEARCH PROGRAM AND OTHER INNOVATIVE MECHANISMS FOR COMMERCIALIZING PUBLICLY-FUNDED TECHNOLOGIES

The scope of work proposed herein will complement and broaden AmTech's on-going research efforts. AmTech is submitting this revised proposal to:

- Cancel the ARPA-sponsored HPCC Program tasks listed in its research proposal submitted December 20, 1993 (awarded by NASA on February 17, 1994);
- Continue and expand the NASA-sponsored JSR Program tasks listed in that proposal; and
- Expand that scope of work, by undertaking an additional set of JSR Program tasks and extending the period of performance for research.

During this period of performance, AmTech will:

- Continue research of issues arising from development of all proposed consortia-formation and joint NASA/industry technology commercialization projects currently in the pipeline from the Office of Aeronautics (Code R) at NASA Headquarters;
- Initiate new aeronautics projects, if requested by Code R;
- Continue research on legal, intellectual property, financial and public policy issues to improve policies, procedures and guidelines for use of the JSR Program;
- Respond to requests for technology commercialization research assistance from NASA centers and the Regional Technology Transfer Centers (RTTC's);
- Undertake research focused on identifying opportunities, techniques, policies and mechanisms for the dual use of government technologies;
- Provide research assistance in facilitating the commercialization of technologies developed through R&D programs authorized by the Ballistic Missile Defense Organization (BMDO);
- Research issues arising from the implementation of NASA's first industry-led consortium for unpiloted aerial vehicles (UAV's); and
- Research industry-led concepts, initiatives and requirements for a multimedia technology alliance.

With the continued assistance of NASA, BMDO and other agencies, as necessary, AmTech will attempt to implement additional collaborative R&D projects to evaluate, understand and recommend the best practices in technology commercialization. AmTech will test this research by engaging in specific pilot projects, utilizing targeted, neutral third party facilitator approaches. These pilot projects will incorporate the steps necessary to improve and modify the technology transfer facilitation process and accomplish the public and private sector coordination required to effectively commercialize a wide range of publicly-funded technologies.

TECHNICAL INFORMATION

Objectives

The research activities proposed herein are designed to provide a sound foundation for one or more federal programs that will: 1) implement collaborative R&D projects and industry-led R&D consortia between the government and the private sector to facilitate the dual use of federal technologies with commercial applications; 2) provide research and assistance related to the commercialization of technologies that are of interest to the sponsors and participants; and 3) include legal, policy, marketing, and transactions research focused on innovative public/private sector R&D collaborations utilizing technology "spin-out" and "spin-in" approaches.

This research proposal is submitted at this time to:

- Cancel the ARPA-sponsored HPCC Program tasks contemplated in AmTech's most recent research proposal (submitted on December 20, 1993; awarded on February 17, 1994);
- Continue and expand the NASA-sponsored JSR Program tasks outlined in that proposal; and
- Expand AmTech's proposed scope of work, by undertaking an additional set of tasks and extending the period of performance for research.

AmTech's most recent research proposal was funded by NASA for a period of approximately eight months beginning February 1, 1994. The scope of work proposed therein, with the exception of the ARPA-sponsored HPCC Program tasks, is being performed at this time, in accordance with the NASA budget submitted with that proposal. The funding used for that work ("existing funding," in the attached budget) is distinct from the funding requested for the scope of work contained in this proposal ("new funding," in the attached budget).

The objectives of this research proposal follow.

<u>For NASA Office of Aeronautics (Code R)</u>:

- Respond to the creation of new collaborations involving aeronautics, sensors, and other aviation-related technologies, as needed;

- Respond to requests from Code R-managed centers for facilitation research and support on other multi-party collaborations;

- Provide facilitation research support to define innovative approaches to collaborative public/private R&D development with the rotorcraft industry;

- Respond (after evaluation and funding analyses from NASA Ames) to information requests from the RTTC's and to the educational needs of the National Technology Transfer Center (NTTC) concerning multi-party collaborations; and

- Prepare white papers and research reports summarizing important AmTech facilitator-based technology commercialization research.

For NASA Office of Aeronautics and NASA Langley Research Center:

- Continue the collaborations currently under development involving technologies sponsored by Code R, including providing research assistance at meetings, seminars, and other forums to examine issues arising from project negotiation and implementation.

For NASA Office of Advanced Concepts and Technology (Code C):

- Use policy and legal research results to formalize the JSR Program and develop permanent policies, procedures and guidelines for Program implementation;

- Continue providing facilitation research support on complex industry/NASA research collaborations, using JSR Agreements and other funded and non-funded cooperative mechanisms used by NASA;

- Use experience-based learning to conduct annual program reviews and implement necessary modifications; and

- Test and report on the use of a neutral nonprofit third-party facilitator to increase the effectiveness of all forms of technology commercialization collaborative agreements with the private sector and academia.

For Ballistic Missile Defense Organization (BMDO):

- Provide research assistance to BMDO concerning dual use technologies and their commercialization potential at various BMDO-sponsored Technology Application Panels;

- Provide research assistance to technology developers in implementing commercialization plans for technologies sponsored by BMDO;

- Provide research assistance for one or more demonstration projects focused on the transfer of BMDO-funded technologies to the commercial marketplace;

- Evaluate BMDO-funded technologies residing in companies, federal laboratories and universities and screen them for commercial potential; and

- Provide a research report summarizing AmTech's BMDO-related collaborative technology commercialization efforts and recommending additional improvements to BMDO's technology application panels.

For Implementation of the UAV Consortium (located at the Dryden Flight Research Center (DFRC)):

- Continue research on the formation of industry-led consortia for unpiloted aerial vehicles under the JSR Program; and

- Research and develop the procedures necessary to implement and monitor the Dryden-based JSR consortium.

For the Multimedia Industry Initiative:

- Research industry-led technology requirements in the multimedia arena;

- Expand the appreciation and use of multimedia technology for the benefit of the public through a National Multimedia Center; and

- Research general approaches and steps required to implement the National Multimedia Center initiative in approximately one year and issue a report of research findings.

Method

The operational methodology utilized for testing the viability of technology commercialization research results will continue to be the case method, where the research is applied to experimental joint public/private R&D collaborative projects, including industry-led consortiums of participants grouped around specific technologies. This method is useful to test the results of our research in real time, bringing immediate potential benefits to the sponsors. It is designed to bring together knowledge, experience and decisions in a timely fashion at each stage of formation of collaborative R&D projects.

To achieve the objectives contemplated in this proposal, AmTech will apply quantitative measures in the cases it examines to determine the value of funded collaborative R&D projects, as well as the value and effectiveness of various federal statutes and regulations used to implement collaborative R&D projects.

AmTech will attempt to measure the volume of R&D collaboration that can be facilitated with limited resources, at the same time it attempts to develop one to three large scale technology consortia at the request of NASA. AmTech also will research issues arising from the development of BMDO-sponsored dual use technology and provide research assistance, where necessary, to BMDO-sponsored technology developers.

Research Agenda and Scope of Work

The research and scope of work contemplated under this proposal will concentrate on the following issues:

For NASA Office of Aeronautics (Code R):

A. Continue prototype development of current Code R collaborations

1. Research issues arising from industry-led technology consortia

   1.1 Authority of NASA to directly fund U.S. companies in NASA collaborations that meet updated JSR Program guidelines;
   1.2 Feasibility of allowing for optional university participation in JSR Projects;
   1.3 Feasibility of the JSR Program to vary the government/industry cost-sharing formula over a wide range of options; and
   1.4 Feasibility of establishing industry-led rotorcraft collaboration.

2. Respond to requests from RTTC's and the NTTC - Provide research support and technical evaluation (incorporating appropriate input from NASA Ames) on RTTC-sponsored collaborations, as well as educational assistance and dissemination of research findings to the NTTC.

For NASA Office of Aeronautics and NASA Langley Research Center:

B. Respond to additional requests for research assistance on other collaborations

1. Research issues arising from specific collaborations, as requested from NASA Headquarters and other Centers.

For NASA Office of Advanced Concepts and Technology (Code C):

C. Undertake policy and legal research for the JSR Program

1. Improve JSR Program implementation and efficiency

   1.1 Use experience-based learning to conduct annual program reviews and implement necessary modifications.
   1.2 Test and report on the use of a neutral nonprofit third-party facilitator to increase the effectiveness of technology commercialization collaborative agreements with the private sector and academia.

2. Metrics - Research and recommend appropriate and reasonable JSR Program metrics (and how to grow the demand for projects).

3. Examine collateral issues:

    3.1 Collaborative R&D approaches in other federal agencies;
    3.2 Other structures for achieving collaborative R&D; and
    3.3 The extent of demand for technology commercialization and R&D collaboration.

For BMDO:

D. Respond to requests from BMDO-sponsored technology developers

1. Provide research support and commercial evaluation on technology commercialization implementation plans.

    1.1 Particular research emphasis will be placed on issues arising from California-based technology developers, and technologies generated by, or located in the Micro Electronics Lab at the Jet Propulsion Laboratory.

For Implementation of the UAV Consortium:

E. Continue research on the formation of industry-led consortia under the JSR Program

1. Examine legal, financial, intellectual property and public policy issues
2. Examine policy issues and feasibility of NASA funding of industry-led consortia.

F. Research and develop the procedures necessary to implement the Dryden-based JSR consortium.

1. Research and suggest the implementation requirements for large-scale JSR consortia

    1.1 for NASA
    1.2 for industry
    1.3 for third party commercialization facilitators, if necessary.

2. Research and suggest reporting requirements for large-scale consortia

    2.1 budget and financial
    2.2 legal and intellectual property disclosures
    2.3 contract administration
    2.4 technical plans and progress against milestones

For Multimedia Industry Initiative:

G. Research issues arising from industry-led development of multimedia technology

1. Examine feasibility of using various implementing mechanisms for public/private sector R&D collaboration on various multimedia technologies

   1.1 Telecommunications
   1.2 Image database R&D
   1.3 Technology areas to be determined by the case participants

2. Examine feasibility and research legal, business, financial and public policy issues arising from long term national multimedia operations by a variety of users and customers.

Periodic status reports will be submitted to the sponsors outlining the research accomplished during the reporting period. A final comprehensive technical report, including lessons learned and recommendations, will be submitted upon completion or termination of each project or consortia researched by AmTech. Additionally, AmTech will seek the widest practicable and appropriate dissemination of this research through a variety of media during the course of its investigation.

ANTICIPATED BENEFITS/CONTRIBUTION TO SPONSORS' MISSION

AmTech's Base Technology Commercialization Program

The research resulting from this revised effort will support the sponsors' collaboration with the private sector by fostering the effective origination and implementation of technology commercialization mechanisms, including JSR projects between the government, universities or nonprofit research institutions and U.S. industry, as well as industry-led consortia centered on those technologies of vital interest to the participants. These collaborations will offer the following benefits to the sponsors, and will assist them in accomplishing their missions:

- Enable government agencies to address and contribute to enhancing U.S. competitiveness;
- Serve as a model for commercialization efforts by the federal government;
- Leverage industry R&D resources to achieve the government's research objectives; and
- Expedite the commercialization of new technology.

Analyzing NASA and BMDO technology at the outset of their R&D programs will enable those agencies to identify and select technologies that can be developed in parallel with the private sector. These cooperative research arrangements, in turn, will maximize the efficiency of the research undertaken, and increase the likelihood of commercialization of the technology, while satisfying the mission objectives of the program sponsors.

Justification for Supplemental Funding Efforts

- Code R Projects under Development - AmTech would like to continue at a high level of service to NASA. AmTech is postured to deliver on projects generated from Code R, and would like to avoid the necessity for retreating from the growing demand to service these opportunities as well as those anticipated from the centers.

  AmTech's research efforts on proposed collaborations for Code R comprise the majority of AmTech's current JSR Program activities. These collaborations consist of 8 JSR projects for the General Aviation Consortium, based at Langley, 1 project for Unmanned Aerial Vehicles, based at Dryden, and an undetermined number of projects for the Rotorcraft Technology Alliance, based at Ames. To date, our work has supported program directors and has involved statutory review, consortia formation, and topic origination.

- Continuation of JSR Program Development - The remainder of AmTech's JSR Program work consists, in part, of efforts to complete the Biofilms JSR project, as well as originate additional JSR Projects at Ames. With the extensive travel and workload currently being undertaken by our staff for both Codes R and C, we are revising the scope of work and period of performance of our cooperative agreement to handle the increased demand.

- Additional Requests for Research Support and Assistance - Additional requests for assistance from Code R-managed centers exceed AmTech's resources to respond. In addition, AmTech wishes to provide research assistance, where possible, to the NTTC and the RTTC's because those organizations, like AmTech, are part of NASA's Commercial Technology Network managed by Code C.

  AmTech has expended considerable effort to pilot a joint effort with the Mid-Continent Technology Transfer Center and provide research assistance in support of a JSR-type agreement for a collaboration. AmTech staff provided guidance for issue identification, project planning, and agreement preparation. This project successfully combined the interests of seven parties into one team. AmTech would like to extend technical research assistance for multi-party agreements to other NASA's RTTC's.

AmTech also will coordinate, where appropriate, with the NTTC to provide research support and assistance for the commercialization of BMDO- and NASA-sponsored technologies.

Upon receipt of all requests for additional research support and assistance, AmTech will inform the NASA Ames Technical Monitor, and request her evaluation and funding analysis before responding.

- Multimedia Industry Initiative - The opportunities of the proposed industry-led national multimedia technology alliance gives Ames Research Center the means to meet several of its goals:

  - Technology Commercialization: The initiative will support technology commercialization with the private sector through the use of various NASA partnering options. Technology commercialization will be indirectly promoted through alliances of private firms, government agencies, schools and other non-profit entities in the National Multimedia Center;

  - Education: The initiative will support public education, the training of workers, including defense conversion training, and formal education at the primary, secondary and university levels;

  - Public Service Outreach: With a focus on the application of multimedia technologies to local nonprofit organizations and local governments, the initiative enables Ames, with the cooperation of the private sector, to introduce government-developed technologies in the public sector;

  - Internal Communications: The initiative will ease the transition of NASA techniques for information analysis, graphical interface and data communications capabilities to an integrated multimedia network.